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his sympathies would have been yet more deeply stirred and his noble eloquence have risen to yet grander utterances than those for which we are so deeply indebted to him.

It is the same with Ireland. You cannot know her people as a tourist. You cannot see them as they are, through the plate-glass of your railway carriage, or from the window of your hotel. To understand them you must live among them. They must know you ere you can know them—a truth of which most tourists, and not a few professed travellers, seem sadly oblivious. Not to aristocratic hauteur or philistine vulgarity, or sectarian bigotry, will they reveal the sacred sorrow bequeathed by six hundred years of defeat and humiliation. This sorrow and the love of country whence it springs, have never yet found befitting utterance in English words. The revealer of Ireland's heart is still to come. Thomas Moore was but the caged canary of a Whig drawing-room. There is more of the true soul of Erin in one air of Carolan, than in all the pretty melodies he ever penned. It is here we touch the key, by which alone it is possible for a stranger to unlock the deeper mysteries of Irish character. Ireland, like Scotland, must be interpreted through her music. The ecstacy of her joy, the agony of her grief, the ardour of her love, and the fervour of her patriotism, otherwise so silent or so extravagant, all find adequate and befitting expression through the medium of this universal language, where it still awaits that transfusion into our mother tongue, which, if we mistake not, will yet add another chapter of beauty and power to the ever-growing wealth of English literature.

GALL'S ORGANOLGY.

To the Editor of the Anthropological Review.

SIR,—On the second page of the leading article in your last number (p. 330), I read as follows:—"Why is it that psychology proper remains where it was 2,000 years ago? Solely because she was too proud or too ignorant to call in the aid of the physiologist and pathologist. So, too, the nearly hopeless and chaotic condition into which the discoveries of Dr. F. Gall, respecting organology, have fallen, is the result of, in the first place, insufficient foundation, and in the second, dogmatic teaching:" and in the next sentence but one, I am informed that "The discussions on the localisation of cerebral action,

before the Paris Anthropological Society, have inaugurated a new era in Science." Now, did the British student derive his opinions of Dr. Gall's discoveries from a perusal of his own writings, I should deem it superfluous to notice such comments as the preceding. Unfortunately, however, that vast storehouse of knowledge, and imperishable monument to the genius and industry of Gall, his work *Sur les Fonctions du Cerveau*, still remains a sealed book to the European public, demonstrating, with additional force, with each successive year's neglect, how greatly its author *was* in advance of his contemporaries, and *still remains* in advance of their successors.

Had I not been previously aware of Dr. Hunt's generous assiduity in blowing the trumpet for his friends, the Paris Anthropological Society, I should certainly have imagined that the announcement,—that the fact of the discussion of the localisation of cerebral action, before the Anthropological Society of Paris, inaugurated a new era in science, had been made ironically; that it had been adopted, in short, as a pleasant mode of rebuking some ill-judged pretensions put forth by the Society or its partisans, so extravagantly hyperbolic does it appear in the presence of the actual and long-standing position of this question. In the first place, it is a familiar fact, that there are a number of considerations which lead so irresistibly to the inference of the plurality of the cerebral organs that, to quote the words of Foderé, "they have been adverted to by almost all anatomists, from the days of Galen downwards, and even by the great Haller, *who felt the necessity (qui éprouvait le besoin)* of assigning *distinct* functions to *different* parts of the brain"; and Comte, the greatest of modern philosophers, says, "Two philosophical principles, now admitted to be indisputable, serve as the immovable bases of Gall's doctrine, as a whole; viz., the innateness of the fundamental dispositions, affective and intellectual, and the plurality of the distinct and independent faculties." In the second place, Gall left on record a series of observations of facts, which, he considered, justified him in associating the manifestations of twenty-seven mental functions with as many distinct localities of the brain; and no evidence has been adduced to invalidate Gall's conclusions, except, perhaps, in one instance, and in this it was not—as I pointed out many years since—the observations of this extraordinary genius that were at fault, so much as the inference he deduced from them.

It has too long been the fashion to advert, in a depreciatory tone, to the labours of Gall, in language which, whilst so conveniently vague and general as neither to require any definite knowledge, nor commit the utterer to any specific opinion, contrives to insinuate—by the enunciation of the merest platitudes as to the desirability of

collecting facts, and the undesirability of hasty induction,—that this great man was the inferior of the writer or speaker, in the caution and sobriety of judgment, which characterise the true philosopher. Surely, it is to be lamented, in the interests of science, that the critics of Gall give us no practical example of the philosophic method and cautious induction in the theory of which they are such masters. They appear to overlook the fact that—if an individual could collect and leave on record such a number of cases of coincidence between special development of brain and special manifestation of a mental function, not really connected with it—it should be tenfold easier to collect cases in disproof. Yet, where are they?

Not to refer to the stronger department of Gall's system, the larger organs of the propensities,—have his critics ever adduced, or can they now show us, an instance of a great mathematician, musician, or painter, small in the region of the brain, appropriated by Gall to number, music, or colour, or the portrait of the author of a dictionary, or a great linguist with sunken eyes? In short, whilst ready in *assertion*, so totally have they failed to illustrate their own precepts, that, having in view the wide divergence between their teaching and practice, one might be tempted to define "facts" as "a word constantly in the mouth of those who never collect any." Referring to this class of critics in his own day, Gall humorously, but sarcastically, remarked, "It would be difficult for such learned men to have recourse to so laborious a source of true knowledge as observation." Where a philosopher has, with patient assiduity, from boyhood to the close of a long life, devoted an unrivalled genius for observation to the collection of facts, and only after long investigation and close scrutiny allowed himself to found a conclusion from the evidence obtained; scientific names, even more eminent than those of our most distinguished critics, are not sufficient to release their bearers from the obligation of supporting their assertions by some kind of evidence, and in default of doing so, they are themselves exhibiting a glaring example of that hasty generalisation and want of philosophic caution they so glibly, and seemingly as a matter course, attribute to one of the most conscientious and painstaking observers of his own or any other epoch. In the mean time, let us not forget that when some supposed authority chooses to distrust the reliability of discoveries, not as the result of observation, but by assumptions furnished by self consciousness,—whilst hundreds of followers prefer the easy task of echoing an opinion, to questioning nature for themselves,—additional numbers impart no additional solidity to the flimsiness of the foundation on which the original dictum reposed.

I have been intimately acquainted with Gall's writings for more

than a quarter of a century, and for a still longer period have lost no opportunity of testing, to the best of my ability, the soundness of his views with regard to the seats of the special faculties, and the result is that, with the exception of those regarding the cerebellum, I am prepared to defend them all, as substantially correct. That the list of the primitive faculties was perfect and complete, or our knowledge of the exact functions and relationships of those discovered,—particularly in the case of the intellectual faculties,—thorough and precise, Gall himself never pretended, and would have been the first to disavow. Gall never undertook the construction of a *system* of psychology,—in fact, expressly disclaimed the pretension of doing so; he simply announced, as a fact, that observation showed that the development of a certain part of the head was associated with the tendency to act in a certain manner, or with the capacity for doing a certain thing. Gall's error with regard to the functions of the cerebellum is greatly to be regretted, having exercised a most unfortunate influence in retarding the reception of his doctrines, by creating a distrust of his care and accuracy as an observer, which, as I long ago pointed out, the circumstances, when rightly understood, do not justify.

At a very early period of my studies, contemplating the nervous system as a whole, it seemed to me that the harmony, everywhere else discernible, was violated by placing the seat of a propensity, —making the female an object of desire, and capable of being called into action by *ideas*—outside the cerebrum. After a time, I found myself almost insensibly connecting the large development of the region of the cerebellum with acute sensation and intolerance of pain. I examined the opinion of physiologists with regard to the function of this part of the brain,—and finding my idea discounted by their writings, and influenced also by reverence for Gall, and still more by the cases that had come under my own observation, indicating a connexion between a prominent cerebellum and strong sexual feelings,—I came to the conclusion that I must be mistaken in my supposition. Doubt and curiosity had, however, been excited, and I at length determined to compare the relative development of the cerebrum and cerebellum in the lower animals with their character and peculiarities. In the course of two years, I examined and separately weighed the cerebrum and cerebellum in nearly every species of bird and quadruped to be found in the British Isles, endeavouring, where practicable, to ascertain the variations, and determine the average in six members of each variety. The following is a very brief outline of the facts I obtained, and the inferences I was led to draw from them.

Observations on horses, pigs, and sheep, show that castration very slightly diminishes the size of the cerebellum, but that the diminution is so trifling as not to counterbalance the congenital variations which occur in the size of the organ.

Castration does *not* diminish the relative size of the cerebellum compared with the cerebrum, the development of the latter organ being quite as much ; or if there is any ascertainable difference, even more impeded, by the effect of the operation.

Unilateral castration produces no perceptible difference in the development of the lobes of the cerebellum. Having removed the right testis from a kitten three days old, I examined the cerebellum at the age of one year and a quarter, but was unable to detect any inequality in its sides, though having placed it in spirits, I repeatedly made it the subject of careful scrutiny at separate intervals of time. An examination of the effects of unilateral castration, in the cases of a ram and a hare, furnished the same results.

In birds, the development of the lateral lobes of the cerebellum is strictly rudimentary, consisting almost entirely of the root of the fifth pair of nerves, and no pons Varolii, as a matter of course, is discernible. The median lobe, or vermiform process, however, attains in this class to an unusual magnitude ; so much so, that the proportionate weight of the cerebellum, compared with that of the cerebrum, is not inferior to the generality of mammalia, ranging from 1 to 4 in the swallow to 1 to 13 in the grey owl.

These peculiarities of organisation suggest two questions,—first, what is the function possessed by the mammalia which may be said to be rudimentary, or wanting, in birds, except in the portion of their body to which the branches of the fifth pair of nerves are distributed ?

Secondly, what function is possessed by birds in a degree as commensurately greater than other vertebrata, as the relative development of the median lobe of their cerebellum surpasses that of the latter ?

The answer to the first question was clearly cuticular sensibility. The thin and membranous skin of birds scarcely presents a trace of nerves,—which would have been thrown away with such a covering as feathers,—and manifestations of surface sensibility appear almost solely restricted to the parts concerned in the selection and deglutition of food.

In pondering on the second query, I was struck with the capacity of birds for traversing great distances, and supporting themselves in a medium of so much less specific gravity than their bodies, together with the infinite grace and elegance which characterise their motions. Such a capacity demanded great muscular power combined with an

extremely delicate sense of resistance, and necessitated the existence of a proportionately large nervous apparatus for generating, storing, and distributing, the appropriate nervous stimulus. In the crow, whose motions are neither rapid nor elegant, the weight of the cerebellum is $11\frac{1}{4}$ grains, and that of the cerebrum 129, being a proportion of 1 to 11·4, whilst in the common gull, who sails through the air in graceful curves, or, tumbling and darting in rapid flights, sports with the wind when at its highest, the weight of the cerebellum is 14 grains with a cerebrum of only 63: a proportion of 1 to 4·5. The swift sparrow-hawk possesses a cerebellum of $6\frac{1}{2}$ grains and a cerebrum of $36\frac{1}{2}$. The slow grey owl a cerebellum of 9 grains to a cerebrum of 120, being in the ratio of 1 to 5·6 and 1 to 13·3. Finally, in the swallow tribe, who may be said to live on the wing, the development of the cerebellum reaches its maximum, being, as compared with the cerebrum, 1 to 4. In birds, then, I consider we may regard it as an established fact that the development of the cerebellum (practically consisting of the middle lobe alone) always bears an exact ratio to the locomotive power.

The question now presented itself, what animals occupy the opposite pole to birds with regard to the manifestation of cuticular or surface sensibility? The answer is the cetaceans, in whom the sense of feeling is so acute as to enable them to communicate with each other at long distances by the vibrations of the water. Pursuing a living prey, and obliged at short intervals to seek the surface for air, and thus lose sight of it, without this special endowment of sensation to keep them apprised of the motions of the object of their chase, they would lose all knowledge of its locality at each breathing time. Their sensibility to pain also appears to be very acute; for I have been assured by an individual, who once saw an embayed porpoise put to death by some fishermen, that the cries of the animal when wounded were heart-rending and conveyed the idea of most intense suffering. In conjunction with this extreme endowment of surface sensibility, the cetaceans present of all animals the greatest development of the cuticular system of nerves which pervade the whole of the layer of blubber interposed in this family between the skin and the muscles, and form a network of extreme minuteness on its external surface.

Now there coexists with this maximum development of the cuticular system of nerves in the cetaceans, just as marked a peculiarity in the structure of the nervous centres, viz., an extraordinary development of the lateral lobes of the cerebellum. In the porpoise, the size of the cerebellum as compared with the cerebrum, is as 1 to $2\frac{1}{2}$, its unusual bulk being entirely due to the enormous development of the great lateral lobes, which equal in absolute size to those of man, far surpass

his or those of any other animal (with one exception to be hereafter mentioned) in the proportion they bear to the other nervous centres.

These facts appear to me to point irresistibly to the conclusion that the median and lateral lobes of the cerebellum have separate functions, the former being the great ganglion of the nerves of muscular resistance, imparting a knowledge of the relative position of the different parts of the body, and the centre of gravity, and constantly developed in the ratio of the animal's agility and balancing power; the latter the great ganglion of the nerves of cutaneous sensibility, and always developed in the ratio of the animal's endowment with this function.

Had however any doubts of the soundness of this conclusion lingered in my mind, they would have been dispelled by an examination of the cerebellum in the Cheiroptera. These insectivora possess jointly the large lateral lobes distinctive of the cetaceans, and the large central lobe characteristic of the bird, and, in conformity with the views of the functions of these nervous centres just expressed, unite the fine tactile sensibility of the former class, with the agility and balancing power of the latter. The same knowledge of the relative position, the distance or proximity, of other bodies furnished to the cetaceans by the vibrations of water, the bat obtains from the pulsations of the air. Spallanzani found that bats when blinded avoided obstacles in their flight with the greatest precision, and this in places to which they were strangers. They flew with rapidity through apertures only just large enough to allow of their passage, and even avoided small threads stretched across the apartment, thus exhibiting an example of tactile sensibility so exquisite as almost to be equivalent to a new sense. The cerebellum in the bat is proportionately to the other nervous centres larger than in any other animal. In the common pipistrelle the average (drawn from six) is cerebellum $\cdot 96$ of a grain, cerebrum $1\cdot 78$.

That there is a relation between the size of the occiput, and the sexual feeling, is I think undoubted, my observations on man impress me with this conviction, and in the horse, the ox, the sheep, and the cat, the diminished size of the nape of the neck in the castrated animal, when compared with the perfect male, is very preceptible. That the ancients were familiar with this relationship,—as well as with many other things, the knowledge of which was once supposed to be an exclusive appanage of modern times,—is evident from the lines

“Non illam nutrix orienti luce revisens,
Hesterno collum potuit circumdare filo.”

Apollonius of Rhodes, also, in speaking of the passionate love of Medea, says, “The fire which devours her, attacks all her nerves and makes itself felt even behind the head in that spot where pain is most poignant when an extreme fervour seizes on all the senses.”

In locating the sexual feeling in the cerebellum, therefore, I believe Gall to have committed an error of inference, rather than of observation. The convexity of the lower fossæ of the occipital bone and their protrusion backwards and downwards, really *have* a connection with the strength of the sexual feeling; but then these conditions are principally due to the development of the under surface of the posterior lobe of the cerebrum, and but in a minor degree to the size of the cerebellum, in the same way as the prominence of the eye, and pouching of the lower eyelid, indicative of philological talent, is mainly caused by the development of certain convolutions of the under surface of the anterior lobe which rest on the roof of the orbit. Not only is the range of variation or diversity in size, presented by the occipital region as a whole, much greater than the deviations from mean size exhibited by the cerebellum, but a larger *proportionate* share in causing these diversities must be attributed to fluctuations in the size of the posterior region of the cerebrum, than to fluctuations in that of the cerebellum, in harmony with the law, that the limits of variation increase in proportion as the functions of organs rise in the scale and become less indispensable to the continuance of life, as we see exemplified in the much larger range of variation in the size of the coronal region of the head—the seat of the affections connected with man's perfectibility and life in society—than in that of the basilar, the seat of those concerned with the conservation of the individual, or at most the family.

Gall's views of the functions of the cerebellum were greatly strengthened by several remarkable cases of loss of sexual feeling occurring after sabre wounds of the cerebellum, for which he was indebted to Baron Larrey. I think it scarcely admits of dispute that pathology offers irresistible evidence of a close connection between the cerebellum and the generative function. The number of cases of apoplexy in which irritation of the sexual organs has proved a correct diagnostic that the apoplexy was cerebellar, are alone sufficient to establish the fact. From my point of view, however, these pathological proofs of relationship are perfectly compatible with the location of the generative instinct in the cerebrum. A portion of the lateral lobes of the cerebellum approximating towards the mesial line must be associated with the *sensation of the sexual organs*, whilst a portion of the central part or vermiform process must have the duty of regulating and controlling the *ensemble* of the muscular acts and positions peculiar to the generative act, which are of a determinate character in different species of animals, and even seem to vary within certain limits in the different races of man. Now that there must be the closest connection between these two cerebellar

functions, and the instinct of propagation, is most certain ; for instance, we often see the latter called into activity in the dog, by the mere accident of his finding himself in a certain position. On some occasions—perhaps I should say normally—the chain of nervous action commences in the cerebrum on the presentation of the image of the female ; on others the spark of ignition lights on the other end of the train, and a peripheral excitant, by sympathetic influence awakens the cerebral desire. Such appear to be the relations between the external sexual organs represented by a portion of the cerebellum, and the true generative instinct seated in the cerebrum.

Let us now compare the comparatively venial error of Gall as to the functions of the cerebellum, with the strange blindness to the most notorious facts—viz., the structure of that interesting class the cetaceans, and the self-evident deductions to which they irresistibly lead—involved in the acceptance of the current doctrines of Physiologists as to the office of this portion of the brain. Dr. Carpenter's *Principles of Human Physiology*, which may fairly be regarded as an orthodox text-book on the subject, has for the last quarter of a century contained the following passage :—

“In proportion as the extremities acquire the power of prehension, and together with this a power of application to a great variety of purposes, still more in proportion as the animal becomes capable of maintaining the erect posture, in which a constant muscular exertion, consisting of a number of most elaborately combined parts, is required—do we find the size of the cerebellum and the complexity of its structure undergoing a rapid increase. . . . Man surpasses all other animals in the number and variety of the combinations which he is capable of exerting, and in the complexity of the combinations themselves. Thus, if we attentively consider the act of *walking* in man, we shall find that there is scarcely a muscle of the trunk or extremities which is not actually concerned in it, some being engaged in performing the necessary movements, and others in maintaining the equilibrium of the body, which is disturbed by them.”

Do we dream ? or does there really exist such an animal as a porpoise—which, devoid of “prehensile extremities capable of being applied to a great variety of purposes ;” without “the capacity of maintaining the erect posture ;” wanting in *every* feature described by Dr. Carpenter as indicative of a large cerebellum—yet claims the distinction of being the only animal smaller than man, which possesses a cerebellum equal in absolute size to this *erect biped's*, and vastly larger when compared either with the body considered as a whole, or with the size of the cerebrum.

Now I venture to say, that no such transparently fallacious assumption can be pointed out in Gall's writings, as, has thus been tacitly accepted without protest by the physiologists of Europe, and allowed

to form the staple article of their faith as to the functions of the cerebellum for the last third of a century.

The advent of Gall broke up the long night of darkness and error as to their own being, under which the human race had slumbered for ages. Sensation, perception, memory, judgment, imagination—the idola of the past, the stock properties of every psychological system from that of Aristotle downwards, instead of being primitive faculties, were clearly demonstrated, by the most masterly analysis, and the most unanswerable arguments, to be simply different degrees or consecutive modes of action, proper to each of the elementary intellectual faculties, and necessarily variable in strength in relation to subjects—specifically distinct. Gall studied the maximum or minimum exhibition of certain passions or capacities, compared with the extreme or defective development of certain parts of the brain, and when a vast number of concurrent experiences had satisfied him of a connection, named the primitive faculty by the simplest words indicative of its function to be found in the vocabulary of everyday life. He thus replaced the phantoms of the metaphysicians, which explained nothing, by terms which speedily asserted their vitality by being constantly heard in the mouths of the people, to assist them in defining and describing their fellow men, thus at once obtaining that sanction from the spontaneous dictates of popular common sense, which is the surest test of the truth of all fundamental ideas.

Dr. Gall himself, ascribed his discoveries to his having given himself ingenuously and unreservedly to the study of nature free from the bias of preconceived opinions and ideas, and without seeking to make his observations square with some *à priori* constructed system. Now it is characteristic of the labours of the true naturalist, the careful observer and honest interpreter of nature, who chronicles her aspects faithfully; that they possess an intrinsic value for all time, and ever remain a solid basis on which succeeding students may carry to a greater height the pillar of human knowledge. What then can Dr. Hunt mean, by stating that the discoveries of Gall have fallen into a “nearly hopeless and chaotic condition?” In the amount of work of the nature of discovery, he accomplished, Gall stands altogether unrivalled, and it is difficult to discern how he could have done more for the success of his doctrines, unless he had had the power of bequeathing to the world his genius, his industry, and his truthfulness.

There was in Gall a breadth and massiveness of intellect, a certain grandeur and nobility of character, which placed him beyond the reach of the jealousies of his contemporaries. The craving for instant appreciation, which besets smaller minds, was to him unknown. He always entertained a due sense of the dignity and importance of his re-

searches, and, confident of his place in history, never allowed his equanimity to be discomposed by the misrepresentations of which he was the object.

"My views of the qualities and faculties of man," says Gall, "are not the fruit of subtle reasonings. They bear not the impress of the age in which they originate, and will not wear out with it. They are the result of numberless observations, and will be immutable and eternal like the facts that have been observed, and the fundamental powers which these facts force us to admit." . . . "Here, then, terminates this work, which for fifteen years the public have been impatiently expecting. I should have wished to defer it still longer to bring the fruits of my researches to greater maturity; but the final hour draws near, and I must be content with leaving this first effort on the physiology of the brain far less perfect than it will be fifty years hence." . . . "If I had been a man to be gratified with a little temporary *éclat* I should have yielded more than twenty years ago to the desire of publishing the first views of a physiology of the brain; but I am prouder of the discovery of the slightest truth than the invention of the most brilliant system."

The great principles established by Gall, of the dependence of mind upon organisation, and the specialisation of the organs, have pervaded and leavened the mind of the age—written themselves in our jurisprudence, modified our views of education, given precision to our treatment of insanity, flavoured the novel, coloured the poem,—whilst thousands of intelligent men in England and America are believers in his doctrines, and avail themselves of their teachings in the practical business of life. That they are still rejected, misrepresented, and vilified by those who claim to represent the orthodox science of the day, far from being strange, is, I apprehend, quite "*en règle*," and merely illustrates some very familiar facts. In the great majority of mankind the strength of the feelings so vastly preponderates over that of the intellect, as to incapacitate them as judges on any subject on which the animus of class prejudices, has once been rooted in their minds by their teachers in early life. At all periods, the number of persons capable of thinking for themselves is infinitely small, and out of these, many are ready to follow science under the wing of the orthodox authorities of the day, reaping fame, and honour, and profit, and social position, who are not ready to sacrifice all these considerations—shall I say advantages—and embrace the martyrdom of ridicule, contumely, and neglect, in the cause of truth. However sad the reflection, it must be admitted that Truth in the England of to-day does not pay.

There are, however, exceptional circumstances to account for the opposition Phrenology has encountered, which fully explain the exceptional bitterness and animosity with which it has been attacked. Men with little minds, little heads, but great vanity, rebel against a

standard of capacity which gauges them correctly. Again, the whole of the genus humbug, the empirics and the impostors of the day, and men conscious of being at bottom thoroughly dishonest and unprincipled, instinctively recoil from a system which threatens to unmask their moral deformities to the eyes of the world, and reveal their true features despite a whole wardrobe of trappings of duplicity. Napoleon boasted of having greatly contributed to put down Gall. His own medical attendant, Corvisart, one of the greatest physicians France ever produced, was an admirer of Gall, and vainly endeavoured to introduce him to the Emperor. "Corvisart," says Napoleon, "was a great partizan of Gall, and left no stone unturned (*fit l'impossible*) to push him on to me, but there was no sympathy between us." In short, Napoleon confessed he felt the greatest aversion for those "who taught that nature revealed herself by external forms." Shortly before the announcement of Gall's discoveries startled the Parisian scientific world, the Institute had summoned courage to ask the first consul's permission to award a prize medal to Sir H. Davy, for his brilliant discovery of the metals of the alkalis. Consent was granted, but the soreness of national defeat rankled deeply within, and upon his hearing shortly after, that the greatest of his comparative anatomists had attended Gall's lectures, he broke out furiously at his levy, and berated the wise men of his land for allowing themselves to be taught chemistry by an Englishman, and anatomy by a German. "He scolded sharply," says Gall, "those members of the Institute who had shown themselves enthusiastic about my new demonstrations. This was the thunder of Jupiter overthrowing the pigmies. Immediately, my discoveries became nothing but reveries, charlatanism, and absurdities, and the journals were used for throwing ridicule—an all-powerful weapon in France—on the so-called bumps."

Dr. Hunt saddles Dr. Gall and his followers with being responsible for the limited acceptance of their science, which he states to be "the result of, in the first place, insufficient foundation, and in the second dogmatic teaching." The "insufficient foundation" should be demonstrated instead of asserted; but admitting it to be true—for the sake of argument—who are so responsible for the circumstance as the party with whom Dr. Hunt identifies himself, the professional anatomists and physiologists? These industrious cultivators of science have turned their special opportunities to such good account, that, half a century after the discovery, and the announcement of the fact by Gall, they have just found out—apparently to their great astonishment—that there really *is* a relationship between certain convolutions of the under surface of the anterior lobe of the brain reposing on the roof of the orbit, and the faculty of articulate language.

Strange to say, however, whether to excuse the long blindness of which they stand self-convicted, or from a misgiving that the public may begin to suspect that they have been greatly misled by these orthodox authorities as to the truth and value of Gall's researches ; with singular bad taste, they signalise their conversion by depreciatory nibblings at the fame of the great master, and by deprecating the supposition that the occurrence forms any ground for believing in the probability of his other discoveries.

As to the charge of "dogmatic teaching"—if a perpetual inculcation of the necessity of collecting facts, and a steady refusal to submit their doctrines to any other arbitrement—in short, a never ceasing, though ever fruitless, call upon their opponents to bring forward observations, in lieu of reasonings and assumptions—be evidence of dogmatic teaching, then Dr. Gall and his followers must plead guilty. But let us listen to the teaching of the accused, and hear the words of Gall, couched in the clear and forcible language, which so unmistakably tells the tale of energy of brain.

"Whoever is not impelled by an innate instinct of observation ; whoever finds it hard to sacrifice his opinions and the views he has derived from his earlier studies ; whoever thinks more of making his fortune, than of exploring the treasures of nature ; whoever is not fortified by inexhaustible patience, against the interpretations of envy, jealousy, hypocrisy, ignorance, apathy and indifference ; whoever thinks too highly of the force and correctness of his reasoning, to submit it to the test of experiments a thousand times repeated, will never do much towards perfecting the physiology of the brain."

This is Gall's dogmatism ; that of his accusers consists in doggedly refusing to take the direct road to knowledge he so clearly pointed out, and persistently confining themselves to suppositions, reasonings, and opinions, garnished with a few occasional flourishes on the "*true scientific method*," the preaching of which they appear to think a satisfactory substitute for its practice. The study of nature is evidently uncongenial to their minds, and, in lieu of observations, and the testimony of facts, instead of "I have seen," we get, "I entertain a strong persuasion,"—"from inquiries I have made,"—"the fact seems to be,"—"if I am not mistaken,"—"it would rather seem probable," &c., &c.

This is, no doubt, easier than collecting facts, by all the difference between talking and doing ; but, unfortunately, like the former, establishes nothing, but leaves the work still to be done. In short, the charge of dogmatism does not attach to those who record their observations of nature, and invite the co-operation of others, but to those who indolently, and arrogantly assume such observations to be erroneous, and treat them with ridicule and contempt. Dr. Hoppe, of Copenhagen, Mr. Crook, and Mr. George Combe, independently arrived

at the conclusion that the portion of brain lying under the zygomatic arch is the seat of the instinct to take food. During twenty years that I have observed the development of this portion of the brain, I have never seen a case where a great depression in this region was not accompanied with more or less weakness of the digestive functions, and I entertain no more doubt of the connection than I do of my own existence. How are we adequately to realize the intellectual torpor of a man in the daily practice of the medical profession, hearing the statement that such an important means of diagnosis exists, yet not taking sufficient interest in the question, to make a single observation to determine the truth, but apathetically resting in preference in the assurance, born of the prejudices of his teachers, that phrenology is all humbug? and who I ask are so responsible and so much to blame as the orthodox professors of Anatomy, Physiology, and Medicine, for the "inadequate appreciation" of Gall's discoveries by the existing generation?

Amongst other objections brought against Gall's discoveries by those who prefer theory and speculation to observation, it is argued that the organs are more numerous than is necessary, and that a smaller number of primitive faculties would suffice by their combination, to produce all the varieties of character we behold in man. I believe that just the reverse is the fact, and that analysis requires, and that observation will ultimately prove, that many require subdivision. To take the "organ of Love of Approbation," for example, shall we conclude that the same portion of grey matter originates the "desire of notoriety or distinction," and the "desire of pleasing"? I think not. Again, with regard to the functions of the "organ of Secretiveness"—I meet with some individuals who instinctively suppress the outward manifestation of the thoughts and emotions that arise in their minds, are habitually shy and reserved, and dislike even being looked at, who yet have no tendency actively to employ deception as a means to attain their ends. Other individuals, on the contrary, who have no shrinking from publicity, instinctively resort to deception as the readiest weapon to their hands in fighting the battle of life, and unless restrained by moral considerations, are profoundly treacherous, and lie from instinct. The first faculty is a defensive one, the latter an aggressive. According to my observations the former class are characterised by the large development of the portion of brain lying above Destructiveness, and now marked Secretiveness in the busts sold in this country; the latter by the prominence of the region immediately before Destructiveness, directly at the spot where the upper part of the front of the ear loses itself in the cheek.

No doubt much remains to be done, before we shall possess a strictly philosophical analysis and classification of all the primitive faculties, and their mutual relations, but this by no means lessens the truthfulness and value of the mass of facts and luminous deductions, for which we are indebted to the genius and industry of Gall. For instance, Gall's disciples know as surely as they know any fact in Natural History, that a portion of the anterior lobe lying on the roof of the orbit, is connected with the talent for philology, and that another portion, at the corners of the forehead, bestows the capacity for music, and such knowledge has a substantive value, although we are not able to define the exact boundary of the tract of neurine which, considered as a whole, has the function of cognising the peculiar qualities of sound appreciable by man,—as articulateness, timbre, pitch, and some others—or even to demonstrate what is doubtless the case, that the organ of articulate language, and that of music or pitch, are continuous with each other, and the rest.*

We see, however, that the general law, that the organs most indispensable to the well-being of the animal, are placed nearest the base of the brain and the mesial line, holds good with regard to the subdivisions of sound, and thus the more essential organ of articulate language is seated below, and within, the comparatively ornamental faculty of music.

It has never yet fallen to my lot to hear anyone declare, that after qualifying himself to judge of the development of the organs by the requisite study, the result of careful examination convinced him that there was no connection between the primitive faculties and the localities assigned to them by Gall; nor can I conceive such a result possible with a person of average intelligence and caution. As far as my experience goes, the reason assigned for disbelief, is invariably the authority of somebody else; some apocryphal tale, or the old threadbare stock objection so often refuted, and so intrinsically silly, of the frontal sinus, and the want of parallelism between the tables of the skull—an objection which, as it presents an exact parallelism in point of absurdity, with avowing a disbelief in astronomy, on account of the aberration of light, or the unavoidable errors in optical instruments, is quite unworthy of serious refutation. In short, it is perfectly clear and palpable that those who reject phrenology do not reject it on account of “insufficient evidence,” because they do not examine the evidence already in existence. No! the real cause is the

* As far as my observations have gone, and the fact is worthy of note, in all great musical composers, Language, as well as Music, is large; indeed, the whole region of the corners of the forehead, including Order and Number, presents a development much above the average.

intellectual indolence and apathy which prevents their taking this step, and induces them to content themselves with *assuming* its falsehood.

Why, indeed, should those who are in the secrets of nature and able to pronounce *a priori* as to what is true, and what is ridiculous, have recourse to so troublesome and laborious a method of obtaining knowledge as observation?

No one who really desires to arrive at a definite conclusion as to the truth of Gall's discoveries, need remain in doubt from any difficulty in procuring the data necessary for forming a judgment. Evidence abounds, easily attainable, unlimited in amount, decisive in character. Setting aside the direct foundation and unassailable basis of his doctrines—the correspondence between energy of function and local development of brain—the beauty and harmony (so greatly beyond human ability to have devised), revealed in the arrangement of the organs, (more especially having regard to their gradual and isolated discovery), and also the irresistible confirmation of the accuracy of their localities afforded by “natural language,” are alone sufficient to stamp Gall's discoveries with truth, in the eyes of all those capable of appreciating the difficulty, or rather miracle, involved in the adoption of any other alternative.

Tests the most conclusive, from which everything dubious may be eliminated, are within the reach of all. Colour is one of the smallest of the organs of Gall, and the determination of its size presents far greater difficulty than that of the tenfold larger organs of the affective faculties, but it possesses the advantage that the nature of its function renders its manifestation little open to dispute. Every few years I find myself in presence of a new batch of hazy speculations on colour-blindness, in which this imperfection is attributed to some supposed defect in the eye, in utter ignorance of the fact that more than half-a-century before, Gall had clearly shown the defect to be cerebral, and pointed out its exact seat. As there are individuals colour-blind and incapable of distinguishing one colour from another, so, on the other hand, there are painters who excel in the harmonies of colour. Here we have a faculty easily discriminated, both in its positive and negative manifestations. Take the masks of half-a-dozen persons afflicted with colour-blindness, and half-a-dozen painters who excel as colourists, and mix them together, and any tolerable practical phrenologist would have no difficulty in separating the two classes. Now, when such things can be done—done even in the case of the smallest organs—and that they can is notorious, ridicule becomes ridiculous, and doubt, a sign of feebleness of mind.

Individuals to whom such facts do not carry the conviction of

logical sequence and connection, may be perfectly qualified to rank under Plato's definition "*animal implume bipes*," but they assuredly lack that nobler characteristic of the genus *Homo*, the gift of reason.

T. SYMES PRIDEAUX.

THE WEIGHT-PROPORTIONS OF THE BRAINS OF AUSTRIAN PEOPLES, WITH REFERENCE TO STATURE, AGE, SEX, AND DISEASES.

By Dr. A. WEISBACH.*

1. *Stature*.—Among the peoples examined in this respect (Magyars, Czechs, Italians, and Germans), there seemed to prevail a general law, that the cerebrum, compared to the whole brain (encephalon), diminishes with increasing stature; but that the occipital brain (and also the cerebellum alone) increases. As regards the absolute weight, it appeared that, generally, middle-sized persons possessed the heaviest, and short individuals the lightest, brains. But the Magyars formed an exception to this; as among them short individuals had the heaviest, and middle-sized persons had the lightest brain.

2. *Age* influences the brain in males and females in an inverse mode, in so far as the total weight is, between twenty and thirty, greatest, and then continually diminishes with advancing age, which decrease is divided in the separate cerebral sections, in such a manner that the cerebrum in males becomes, with advancing age, relatively larger, and the occipital brain smaller. In females (German), the total brain-weight is also, between twenty and thirty, greatest, after which time it steadily diminishes; but, with this difference from males, that in the former the cerebrum becomes, with advancing age, relatively smaller, the occipital brain (or the cerebellum and the pons alone) becomes relatively larger.

3. *According to Sex*.—In both nations examined in this respect, namely, Germans and Slavonians, it appears that the female brain is, on the whole, smaller than the male brain, but in the Germans the

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